ABSTRACT

Aim. To determine the agreement rate between histopathologic diagnosis and radiographic interpretation of jaw lesions.

Methods. Preoperative and postoperative histopathologic diagnosis were compared for agreement.

Results. A total of 20 cases were included in the study. The agreement rate between histopathologic diagnosis and radiographic interpretation was found to be 80%.

Conclusion. CBCT findings might predict histologic results more accurately.

KEYWORDS

CBCT, Histopathology, Jaw Lesions, Radiology

INTRODUCTION:

Preoperative radiographical assessment of the maxillofacial lesions is of great importance in guiding the surgeon during surgical procedure in reducing post-operative complications. Panoramic radiography has long been considered the gold standard for evaluation of different jaw lesions. However, although two-dimensional (2D) radiological studies provide relevant information, in many situations they have limitations, such as indicating the location and size of a lesion in the buccolingual plane, showing characteristics of the surface (smooth or rough), and demonstrating changes that develop over the period of time in order to evaluate progression of the lesion. CBCT offers an additional advantage in reducing post-operative complications. Panoramic radiography has long been considered the gold standard for evaluation of different jaw lesions.

CBCT enables a large quantity of data to be acquired within a span of short time and low dose of radiation compared with conventional computed tomography (CT). CBCT uses a conical X-ray beam (in contrast to the fan beam of conventional CT) and a special detector that, depending on the technology developed by the manufacturers, may be an image intensifier tube or an amorphous silicon flat-panel detector. The X-ray source and reciprocal detector rotate synchronously around the head of the patient, in a single scan.

Single projection images are known as basis images, these acquired at predetermined degree intervals. Software programs incorporating back-filtered projection are applied to the series of base images to generate a 3D volumetric data set, creating a spherical or a cylindrical volume called the “field of view” (FOV), which can be used to provide visualization of the lesion to make provisional diagnosis.

Image analysis

Preoperative CBCT images were completed and reviewed for each patient, three-dimensional image initially utilized to make visualization of the lesion to make provisional diagnosis.

RESULTS:

A total of 20 patients were (11 males and 09 females) taken in this prospective study. In which 08 were of upper jaw and 12 were of mandibular lesions (Table 2). In our findings we observed that 16 out of 20 radiological provisional diagnosis has been correlating with histopathological final diagnosis. (Table 1)

Table 1- Data analysis of radiological diagnosis with histopathological diagnosis of the patients.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Age</th>
<th>Sex</th>
<th>Site</th>
<th>CBCT provisional diagnosis</th>
<th>Histopathological final diagnosis</th>
<th>Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>20</td>
<td>F</td>
<td>Maxilla</td>
<td>Periapical lesion</td>
<td>Periapical granuloma</td>
<td>Yes</td>
</tr>
<tr>
<td>2.</td>
<td>28</td>
<td>F</td>
<td>Mandible</td>
<td>Cement-osseous dysplasia</td>
<td>Compound Osteoma</td>
<td>Yes</td>
</tr>
<tr>
<td>3.</td>
<td>10</td>
<td>M</td>
<td>Maxilla</td>
<td>Dento-alveolar abscess</td>
<td>Granulation tissue</td>
<td>Yes</td>
</tr>
<tr>
<td>4.</td>
<td>23</td>
<td>M</td>
<td>Maxilla</td>
<td>Condensing osteitis</td>
<td>Traumatic neuroma</td>
<td>No</td>
</tr>
<tr>
<td>5.</td>
<td>28</td>
<td>F</td>
<td>Mandible</td>
<td>Odontogenic keratocyst</td>
<td>Central hemangioma</td>
<td>No</td>
</tr>
</tbody>
</table>
CBCT uses a conical X-ray beam (in contrast to the fan beam of conventional CT) and a special detector that, depending on the technology developed by the manufacturers, may be an image intensifier tube or an amorphous silicon flat-panel detector. The X-ray technology developed by the manufacturers, may be an image intensifier tube or an amorphous silicon flat-panel detector. The X-ray source and reciprocal detector rotate synchronously around the head of the patient, in a single scan.

It revealed detailed information about lesions location, extension and relation to the adjacent vital structures, which aid the specialist in planning treatment in a less aggressive manner avoiding damage to vital structures with subsequent decrease of complications and in a relatively shorter time. Nakagawa et al. mentioned that accurate preoperative radiological examination of odontogenic lesions avoids surgical complications, and reduces surgical stress.6

CBCT offers an opportunity for a clinician to track growth change, appreciate borders in a depth perception that may otherwise be difficult to discern, and analyze relative approximation of adjacent vital structures. The advantages of CBCT in regard to evaluation and treatment pertaining to dental/vital structure include increased visualization and exact location determination. Disadvantages of CBCT include cost and increased radiation exposure when compared to PANORAMIC radiography.6

CBCT scan can give high diagnostic accuracy regarding lesions...
extension, buccal and/or lingual expansion, resorption of the adjacent teeth roots and relation to the adjacent anatomic structures. This could be attributed to surgical factor including accidental removal of the thin bony spicules during preparation of the surgical access to the lesion or radiographical factor including insufficient percentage of minerals loss to be appeared as a defect on the radiograph. In the diagnostic process, histopathological analysis is considered to be the gold standard in determining the presence and nature of a disease. (Figure 1 & 2. Showing Axial and Coronal CBCT view; Figure 3. Showing Histopathology picture of Unicystic Ameloblastoma).

In our study we compared the radiologic provisional diagnosis with histopathologic final diagnosis gives 80% accuracy rate in the correlation of the diagnosis. From these results, we found that, CBCT findings might predict histologic results more accurately. Also it has benefit to the patient including less time, cost, and radiation dose compared to more sophisticated CT scan imaging technique. It also guides the clinician during surgical procedure in a more predictable manner.

CONCLUSION:
CBCT now has become more widely accepted as a diagnostic technique for 3D imaging in jaw lesions as alternative to CT. Although soft tissue definition is limited due to poor contrast resolution which can be a limitation, CBCT can provide detailed information which can be use as described in the diagnosis, follow-up, and treatment of patients.

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